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THE INFORMATION EXPLOSION AND ITS IMPLICATIONS FOR THE COUNSELING FUNCTION, OR WILL COUNSELING BE ELIMINATED IN THE CYBERNATION REVOLUTION.

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DESCRIPTORS- *COUNSELING SERVICES, VOCATIONAL DEVELOPMENT, VOCATIONAL COUNSELING, *INFORMATION PROCESSING, *COMPUTERS, *CYBERNETICS, SPEECHES, TECHNOLOGICAL ADVANCEMENT,

LARGE SCALE GUIDANCE INFORMATION SUPPORT SYSTEMS MAY MEET THE PROBLEMS POSED BY THE INFORMATION EXPLOSION AND CYBERNATION. ASSUMPTIONS ABOUT COUNSELING, THE ROLE OF THE COUNSELOR, THE CLIENT, DECISION-MAKING, VOCATION AND EMPLOYMENT, AND GUIDANCE INFORMATION SYSTEMS ARE REVIEWED. THESE ASSUMPTIONS PROVIDE THE RATIONALE FOR THE SUGGESTIONS MADE. BECAUSE GUIDANCE INFORMATION AVAILABLE TO THE COUNSELOR IS LIMITED (SOURCES BEING OCCUPATIONAL BRIEFS, COLLEGE CATALOGS, SCHOLARSHIP DATA, AND HIS OWN DIRECT AND VICARIOUS EXPERIENCE WITH THE WORLD OF WORK), GUIDANCE INFORMATION SYSTEMS WHICH ARE COMPLETE AND FLEXIBLE, WITH PROVISIONS FOR INPUT AND UP-DATING, SHOULD BE DEVELOPED. THE COUNSELOR CAN BE A SIGNIFICANT INFORMATION SOURCE FOR STUDENTS IF HE ACCEPTS THE CONCEPT OF MAN MACHINE SYSTEMS. SYSTEMS WHICH COULD BE DEVELOPED INCLUDE EDUCATIONAL OCCUPATIONAL INDEX SYSTEMS, OCCUPATIONAL INDEX SYSTEMS, OCCUPATIONAL OPPORTUNITY SYSTEMS, COLLEGE ACCESS MONITORING SYSTEMS, AND GUIDANCE RESEARCH AND DEVELOPMENT SYSTEMS. FEDERAL FUNDING ON A PROGRAMMATIC BASIS IS URGED. THE USEFULNESS OF INFORMATION SYSTEMS COULD BE MAXIMIZED BY RESEARCH IN THE FOLLOWING AREAS--AMOUNT OF INFORMATION, PRESENTATION OF OCCUPATIONAL AND EDUCATIONAL INFORMATION, AND "PERSONAL INTELLIGENCE." THIS PAPER WAS PRESENTED AT THE COLLEGE ENTRANCE EXAMINATION BOARD INVITATIONAL CONFERENCE ON THE PREPARATION OF SCHOOL COUNSELORS (CHICAGO, FEBRUARY 25, 1966). (WR)

The Information Explosion and its Implications for the Counseling Function

or

Will Counseling Be Eliminated in the Cybernation Revolution?*

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INTRODUCTION

The first title of this paper is the one assigned to me. I added the second, because I think it states more accurately the problem with which we should be concerned--must be concerned, in fact, if we hope to continue the contribution of counseling to man and society. While most of my remarks will pertain rather specifically to the narrower problem of the so called "information explosion," and its implications for counseling, it is essential that we view these implications from the broader perspective of cybernation. The problems of cybernation, with particular if unintended implications for counseling, have been stated and discussed clearly in the document entitled "Triple Revolution," prepared by an interdisciplinary Ad Hoc Committee comprised of some 32 scholars and scientists. Several passages from this document should be helpful in describing this perspective. The "Triple Revolution" begins with the following statement (1),

> THE CYBERNATION REVOLUTION: A new era of production has begun. Its principles of organization are different from those of the industrial era as those of the industrial era were different from the agricultural. The cybernation revolution has been brought about by the combination of the computer and the automated self-regulating machine. This results in a system of almost unlimited productive capacity which requires progressively less human labor. Cybernation is already reorganizing the economic and social system to meet its own needs.

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In regard to the effect of information on man in the age of cybernation, the Committee says,

> The major difference between the agricultural, industrial and cybernation revolutions is the speed at which they developed. The agricultural revolution began several thousand years ago in the Middle East. Centuries passed in the shift from a subsistence base of hunting and food gathering to settled agriculture.
>
> In contrast, it has been less than two hundred years since the emergence of the Industrial Revolution, and direct and accurate knowledge of the new productive techniques has reached most of mankind. This swift dissemination of information is generally held to be the main factor leading to widespread industrialization.

The challenge which cybernation presents to counseling is stated clearly in another article by Robert Theobald, the British economist, and a member of the Ad Hoc Committee. In "Cybernation and Human Rights" he says (2),

> I use the word cybernation because it represents something quite different from automation. Automation was the process by which you could take a block of metal, put it in at one end of a series of machines and it would come out at the other, as a finished engine block, without the need for human intervention. Automated machinery could do some things fast and well; nevertheless, its potential to organize people out of work was limited because it was inflexible.
>
> Cybernation, however, is highly flexible and will become more so as time passes. Cybernation is the process of linking a computer, which is effectively a machine which will make decisions, and using it to control automated machinery. These interlocking machine-systems can often be controlled by a few people sitting at computers, while the requirements for other workers are very small, for not only will the machines do all the work but the latest ones are being built practically to repair themselves. The potential to organize human beings out of work in order to increase the efficiency of machine-systems is already large and rapidly growing. In other words, the present type of change in technology cannot be considered merely a continuation of the organizational process of the last one hundred and fifty years--it means something completely new which is quietly taking place all around us. Cybernation involves a production revolution which has two major consequences. First, in the field of production it is challenging and will increasingly challenge the supremacy of man's mind, and it will do this just as surely as industrial revolution challenged and overcame the supremacy of man's muscle. In the relatively near future the machine-systems will take over all repetitive physical and mental production tasks and huge numbers of people will be thrown out of work. It has been estimated by some authorities that as little as 10% or even 2% of the labor force will be required for conventional work in the future.
>
> The idea that we can continue to aim at finding a job for everybody is obsolete. A large proportion of those born in the fifties and sixties

> have no prospect of ever holding an ordinary job. There is no role in today's economy for those teen-agers who are high-school drop-outs and there is increasingly little place for those over fifty-five.

The impact of cybernation has already been felt by counseling, and a number of changes are discernable already. Three kinds of change in counseling are especially evident. Counselors are exploring new or different ways or methods of changing behavior, and the kinds of behavior with which they are concerned is broadening. In addition, counselors are offering their services to increasing numbers and kinds of people. Some of the changes are basic, and tend to invalidate many of the traditional assumptions and methodologies of counseling. For example, counseling has been essentially a middle class institution. However, the emerging emphasis on counseling as a method of social change in areas such as job corp centers and underprivileged neighborhoods has extended counseling services to those whose values are much different than those of the typical counselors. Many of our new clients place little value on work, have never thought in terms of a career, and relegate education to the lower end of their social status scale, if they consider it at all. There is, as a result, constant need to assess the validity of our traditional assumptions as we discuss emerging changes and their implications for counseling. More specifically, the so called "information explosion" cannot be described adequately as simply an increase in the amount of information. Even if it were, the implications for counseling would be tremendous in terms of information storage and retrieval problems. Not only is there an increased amount of information, but the new kinds of emerging information and the uses to which information is put in counseling are changing. While fascinating, I find the concept of cybernetics and the information explosion as it relates to the counseling function extremely complex and tricky. Nevertheless, one means by which we untangle and understand the complex is to talk about it. Towards this end, I appreciate this opportunity to explore some tentative ideas with my colleagues from several parts of the counseling profession.

My remarks are concerned with three general topics. First, there are several assumptions which I am making with regard to the counseling function and information which I simply want to list. Second, the notion of guidance information support systems and their control will be explored. Finally I want to raise some questions regarding needed research and the function of information in counseling.

ASSUMPTIONS

The following assumptions are intended to provide a rationale for the suggestions made in the final sections of the paper. They are not examined in any detail at this point due to the time limitations, but the absence of a discussion should not be taken as an unwillingness on my part to discuss.

1. Counseling is a means by which counselors assist individuals to make and implement decisions intended to satisfy the individual.
2. Counselors, by definition, should know more about the kinds of information needed and the kinds of behavior effective in making decisions and plans than do counselees. This is not to say that the counselor knows what is best for the client in regard to terminal behavior--he may, but that is not the present concern--but only that the professional counselor should know which kinds of behavior are most likely to lead to decisions and plans satisfactory to the client.
3. Knowing this, the counselor has an obligation to promote those kinds of behaviors over less effective ones.
4. The final outcome (terminal behavior) of counseling is client behavior directly related to the client's goals or reasons for seeking counseling. While self-understanding, personal insight, and self acceptance are all important parts of the process, they are just that--the process. The individual may increase his self-understanding 150 points, but unless

he is able to change his behavior (including attitudes) in the direction he prefers, little effective counseling has taken place.

5. Decision making and planning, by definition, make use of information--or of noise interpreted incorrectly as information. In the final analysis, all the individual has to work with is information of a given quantity and quality and his interpretations or feelings about the information. The feelings are important, but useful only in regard to the "goodness" (relevance) of the information possessed.

6. To the extent that a counselor is concerned with decision making, he makes use (or should) of information, and therefore has an obligation to employ the best information available for a particular client's needs.

7. Information has both objective and subjective characteristics, and these characteristics are not inconsistent. For example, the chances for each of two students being admitted to a college may be three out of ten. In the objective sense the information is clear. It is, at the same time, reasonable for one student to view the information as favorable, and the other as unfavorable. In terms of his personality, outlook, perspective, style, or whatever, one is willing to gamble or bet on these odds while the other is not. The subjective characteristics of the information differ with individuals. The counselor must recognize both aspects of information in order to maximize its usefulness for clients.

8. Vocational and educational decision making are becoming a life long process for an increasing proportion of the population. Thus the design and development of guidance information systems must provide for life stages extending beyond adolescence and early adulthood.

9. As the distinction between job, i.e. how one earns a living, and vocation, i.e. the major activities in which one is interested and devotes his time, becomes more widespread, educational-vocational information must reflect such differences. For example, information about education and training, jobs, and vocations must distinguish clearly between the several functions of activities. Stated another way, the information should assist individuals to make decisions as to pursuing training or education on the basis of <u>both</u> employment and vocational goals. The individual should not be discouraged from a particular vocation simply because his chances for using a vocation as a job source (employment) are slim. The "Triple Revolution" expresses the same concern.

> Cybernation raises the level of the skills of the machine. Secretary of Labor Willard Wirtz has recently stated that the machines being produced today have, on the average, skills equivalent to a high-school diploma. If a human being is to compete with such machines, therefore, he must at least possess a high school diploma. The Department of Labor estimates, however, that on the basis of present trends as many as thirty per cent of all students will be high school drop-outs in this decade.
>
> What is man's role when he is not dependent upon his own activities for the material basis of his life? What should be the basis for distributing individual access to national resources? Are there other proper claims on goods and services besides a job?
>
> Because of cybernation, society no longer needs to impose repetitive and meaningless (because unnecessary) toil upon the individual. Society can now set the citizen free to make his own choice of occupation and vocation from a wide range of activities not now fostered by our value system and our accepted modes of "work." But in the absence of such a consensus about cybernation, the nation cannot begin to take advantage of all that it promises for human betterment.

10. Neither individual counselors nor most educational agencies have the capacity, or resources to maintain anything like an adequate guidance information system on an independent basis. While they must play important roles in designing and maintaining information systems, counselors can expect to become users of complex and comprehensive systems maintained on a state, regional, or national basis.

11. The technology for developing sophisticated guidance information systems exists.

These assumptions may be questioned by many of you and they are not totally clear to me--that is, as clear in terms of specificity and implications, as I hope to make them eventually. Nevertheless they are basic to the following section of this paper.

GUIDANCE INFORMATION SUPPORT SYSTEMS

The guidance information available to most counselors consists of two components. The first is the two or three file drawers of occupational briefs and several shelves of college catalogs and scholarship data available in his school or counseling center. The second is his own direct and vicarious experience in schools with the world of work. Both are extremely limited as compared with all the possible information available. The second, in addition, is particularly haphazard. Probably a third source needs to be included for most of us--that being the "I Would Imagine" information machine. Because the first two components fail to satisfy a great many of the information requests put to us by counselees, we have developed the "I Would Imagine" machine. The exact nature of the machine varies from counselor to counselor, and some are better than others, but they all work about the same way. For example when asked by a counselee, "What can I do to satisfy my interest in languages and science?" the counselor turns on his machine and generates, "I imagine you could be an engineer for the Greasy Oil Company in Chile." This is not a bad answer except that Greasy Oil and similar employers may have no interest in the foreign language training of engineers. Or to the question, "Should I get a masters degree in business administration or get some experience first?" the college counselor turns on his machine and gets, "I imagine that a masters degree would increase the potential employment opportunities for you." This in spite of the fact that for 76 per cent of the

major employers just the opposite is true. (Incidentally, a fellow named Kuder has built and marketed his particular version of the "I Imagine" machine and has made a fortune.)

The point is simply that most of us counselors have only these three sources of information to work from, and can hardly be blamed for using them as best we can. The tragedy of this is that we need not depend upon these--we could develop what I refer to as guidance information support systems. Before suggesting some examples, it may be helpful to examine the concept in greater detail.

A guidance information support system has several characteristics, all of *which are technically feasible at this time.* In regard to capacity, the system must be able to store all information pertinent to the particular topic or subject. The criterion of completeness, of course, is determined by those using a system, and the problem will vary in difficulty by subject area and whether actual content information is to be stored or the system is to be concerned only with index information. In some cases, sub-systems can be combined to obtain the desired capacity.

Provisions for input and up-dating must be such to at least approximate a real time system. For example in a system designed for monitoring college admissions, weekly changes in statuses of individual institutions must be entered. Similarly the weekly up-dating must be reflected immediately in output to counselors. An example of a system not meeting these requirements was developed for a large government program sponsored by the recent poverty legislation. In this system, which was intended to monitor personnel flow, there was a three months time lag between input and output regarding the numbers and characteristics of youth in the program. Planning based on output from the system often resulted in chaos.

In addition, guidance information support systems must be flexible in regard to a variety of output modes and formats dictated by the particular characteristics of institutions and counseling programs. Finally, guidance information support systems must be economically feasible. This necessitates distinguishing between the initial system development investment and ongoing system operational costs. It should be apparent that systems meeting these requirements must be computer based or computer assisted. I will depend upon descriptions of illustrative systems for elaboration of these characteristics.

First, however, I want to say something more about the need for support systems in guidance. While recognizing that a counselor is only one source of information to students about opportunities for education and work, and recognizing also that providing information is only one of the many functions of counseling, it is nevertheless accurate and fair to assert that a counselor can be one of the most significant information sources for pupils. It is, however, literally impossible for a counselor or any single human being to remember all that needs to be known. While we have not aspired to such goals in recent years, we have worked under an increasingly unrealistic assumption; namely that a guidance program or center can maintain a collection of most used information and a sufficiently current index of information available from other sources. The claim of unrealistic could be supported simply from the volume of information involved, but there are other reasons. There is implicit in such an assumption that man without assistance can manipulate and retrieve information in all of the various ways appropriate to helping counselees. I suggest that he, the counselor in this case, can approach this goal, but only by accepting the concept of man machine systems. A man machine system involves an inanimate object which has a power supply independent of the operator capable of achieving man identified results and dependent upon man for direction and control. It involves a set of planned procedures in which

man and machine capabilities are used in an integrated manner to achieve results man could not achieve without the machine. Perhaps the most significant aspect of man machine systems for guidance information support is the extremely detailed and careful planning required. Obviously the greater the scope of the system, the more challenging the planning is. One of the great advantages of such a system is that it provides an effective means for evaluating and testing guidance procedures.

GUIDANCE INFORMATION SUPPORT SYSTEMS

Educational Occupational Index System

Perhaps one of the most obvious kinds of guidance information support systems would be one concerned with educational and occupational information. As pointed out earlier, the amount of information available to most students is essentially limited to that available in the local school, supplemented by whatever additional materials counselors or librarians might know of and obtain. Rather than maintaining an extensive information collection, the counselor's objective should be to, (1) maintain a selected collection of materials appropriate to the particular needs of his counselees, and (2) have access to a system for selective acquisition of additional materials as needs change.

A system could be developed to provide guidance information on a national basis. It would involve a national center for collecting and coding current analytical data about available educational and occupational guidance materials. The center would involve an extensive computer based data storage and retrieval system. The system would expand tremendously the educational and vocational aspiration areas for students. In addition, it would allow counselors to make selected use of information, using a variety of criteria. Not only would counselors have more current information about a vastly increased amount of materials, but the information would also be coded with several criteria, thus making it possible to meet relatively specific student needs.

Essentially the system would input descriptions and evaluations of vocational and educational information publications as they became available. Counselors would make inquiries to the system, even indicating such things as the intelligence or reading level of the group of students involved, and receive print outs or other displays indicating the most appropriate materials available in terms of such things as student characteristics, cost of information, etc. The system could have a variety of input/output modes including manual, punch cards, document readers, typewriters, teletypes, and cathode ray tubes.

Data from the system would be valuable for research purposes. It would be possible to identify specific areas in which more materials and information were needed to be developed and the record of counselor inquiries would provide valuable data regarding the work, attitudes, and competencies of school counselors. It would be possible to identify specific areas in which more materials and information were needed.

Occupational Opportunity System

A similar system on either a state or regional basis could be developed for job opportunities and labor market information. Systems involving the exchange of local labor market information by teletype have been developed in several states. The concepts underlying these relatively unsophisticated systems could be expanded via a computer based system which would provide current and projected employment opportunity information to counselors. State and regional systems would increase the meaningfulness of terminal high school and technical junior college job placements through increasing employment opportunities. Even more critical is the need to provide a variety of job opportunity alternatives to individuals who have invested four or more years in higher education. Placement systems for college graduates should be as broad based as the programs represented by applicants. Usually, however, the graduate is able to make himself known to relatively few employers, and relatively few

employers in turn are known by the graduate. Campus interviews are expensive and often beyond the capabilities of smaller employers, many of whom would be attractive to applicants. The computer based system could be extended beyond job opportunities descriptions to include remote audio-visual interviews, stored audio-visual statements by applicants and stored audio-visual job and company descriptions.

Using such a system, an applicant might enter his competencies, characteristics and job criteria, and receive a print out of the most appropriate positions available. He could also "visit" several companies throughout the country, present himself to several employers, engage in a remote interview--all in a short period of time. To those who suggest the system is cold or inhuman, I would remind that whatever controls seeming appropriate can be built into the system. Further, nothing could be quite as inhuman as for the young graduate to arrive at Cedar Rapids and discover that 90 per cent of the correspondence leading to his new job was misleading.

College Access Monitoring System

The College Entrance Examination Board has been conceptualizing and writing about higher education as a national resource and has been particularly concerned with the access to it. College admissions has become a complex, confusing, and often botched procedure in which neither the best interest of students, nor colleges are served. We currently have no way of determining the accessibility to higher education on a national basis at any given point in time. The vague historical descriptions, which are better than no information, are not satisfactory.

The Board has been exploring advantages and problems of a national monitoring system (my term, not theirs) for college admissions and I can only offer my encouragement. The system, as I conceptualize it, would involve computer random access storage of the admissions status of all participating colleges--essentially the total number of students to be admitted and the remaining openings at any given point in time, and rather detailed information regarding student character-

istics, including applicants as well as rejectees. The selective admission characteristics of each school could be included along with historical data, thus providing a basis for generating predictive statements about current year's admission. Assuming something like a weekly up-dating schedule, counselors should be able to provide much more useful information to students regarding admissions and scholarships than is now the case. In addition, and in the long run, this is probably the greatest contribution of the system. Those responsible for planning the development of higher education would have sound and specific information from which to work.

Guidance Research and Development Depository System

Two related information problems of another kind have disturbed me for some while. One involves implementing research findings in counseling practice and counselor education, and the other is the needless duplication of program development efforts in schools and colleges throughout the nation.

One of the most useful guidance information support systems, in my opinion, would be a research and development information depository for use by counselors, counselor educators, and pupil personnel service program administrators. An obvious beginning would be an automated index system which would catalog research articles and reports, and program documentations. One could make inquiries, indicating both general and specific interests, and receive print outs listing appropriate references and sources. While certainly useful, particularly for the researcher, its chief advantages would be a centralized index providing more rapid retrieval references--not actual documents.

I would suggest expanding the system in several ways. First it would be helpful to store not only references, but annotated references giving brief descriptions of research emphasizing implications for practice--with special attention to the particular counseling behaviors involved. In regard to program development, the input could include brief descriptions of the environments involved, the specific

values of the programs included, and the extent of documentation available. In addition, the system in many instances could provide for two-way telephonic communication between the system operator and the inquirer. Regular telephone conversations, teletype exchanges, or even video-sonic transmissions could be employed. The advantages, it seems to me, would be the ability for the inquirer to obtain an initial indication of the appropriateness of particular ongoing programs for his needs. It is my guess that in a great many cases counselors wanting to develop programs for a particular function would find that similar programs were already operational and well documented, thus allowing them to devote their efforts to adapting and implementing existing systems, and improving upon the work done by others.

There are a variety of additional kinds of guidance information support systems, that might be developed. They involve such things as audio-visual presentations of vocational educational information along imaginative formats, and computer based simulation systems for use in decision making training. In the interest of time, however, the four illustrations just provided will have to suffice as an indication of the kind of impact which large scale information support systems could have on the counseling function.

I want to end my remarks on this topic with a few comments regarding the development and maintenance of the kind of systems I have described. In brief, my position is this. Regardless of who develops the system and how, a certain amount of overlap, duplication of effort, false starts, confusion, and lack of efficiency are bound to exist. This is due simply to the tremendous complexity and scope of the problems with which the systems would be concerned. I'm concerned here with national systems, and am betting that there will be a positive correlation between the amount of such difficulties, and the extent to which the systems are administered by the federal government. Federal funds, either awarded directly or through reimbursement of user fees, would seem to be a resonable source of maintenance funds. Initial research and development efforts might best be supported through federal funding, granted on a programmatic, as contrasted to project, funding basis.

It is too early to know whether the national network of educational research and development centers and the regional laboratories to be supported through the United States Office of Education can provide effective leadership for national systems such as those described above. Certainly such agencies should be responsible for regional systems.

Assuming that those agencies can and will develop and maintain some national systems, I would hope that other existing agencies such as, for example, the College Board, American College Testing Program, and System Development Corporation; new organizations which might be formed for the development of specific systems; and private industry, might all participate in the development and maintenance of systems. Innovation, creativity, and efficiency will be needed to make these systems go, and the probabilities for maximizing these characteristics are greatest through the decentralization of responsibility and control.

Every effort should be made to coordinate the various systems. This might be accomplished in part by a council of users armed with sufficient resources to keep informed of guidance information needs and the various attempts to meet them. This would need to be a working council with members having released time and funds to do an effective monitoring and advising job.

Perhaps the most important notion in regard to the development of guidance information support systems, is that the scope of the systems match the magnitude of the issues presented by cybernation. We must be resourceful, and equally important, bold, in not only research and development, but implementation as well.

RESEARCH

The kinds of information systems described above represent to me things which can be done now to increase the value of information in counseling. There is sufficient research and experience to suggest that they would be helpful. As we learn more about the use of information in counseling, such systems would

undoubtedly be refined and in some cases eventually changed dramatically. While these kinds of systems could become operational soon, there is urgent need to undertake research concerned with information in counseling so that we can maximize its usefulness and not be overwhelmed by the continuing information explosion. I will conclude my remarks with a few comments about some of the research which I feel needs immediate attention.

A general problem needing attention concerns the amount of information which counselors and counselees actually use. As John Cogswell and I recently documented in a study, and as most practicing counselors know from experience, only a small proportion of the information normally stored in cumulative folders is used by counselors for most counselees. In a very real sense, pupil appraisal programs have been in large part based on the exception report notion. Much of the information collected about pupil aptitudes and achievement is done for purposes of identifying pupils whose behavior is exceptional--that is, not what we would expect from previous information. The other primary basis for most pupil appraisal programs is a predictive one, in which we want to assist pupils to make accurate estimates of outcomes of various alternative behaviors.

What appears to happen, however, is that in regard to both functions, counselors use very small amounts of the data actually scored. For example, while a Differential Aptitude Test profile and often an answer sheet are stored in a cumulative folder, counselors frequently use only the combined V and N score for predictive purposes. Similarly, while ITED scores are stored, most counselors refer only to the composite score percentile. The same kind of thing is true of most kinds of test and non test data contained in cumulative folders. Yet, in most schools we continue to store and handle reams of information which is never used.

It would not be difficult to undertake a number of studies to determine the outcomes and implications of a variety of appraisal information con-

figurations. One might begin, for example, with a series of working conferences attended by counselors representing schools using different configurations. This thorough review of the existing configurations could lead to several experimental studies comparing alternative configurations and systems involving a variety of schools, pupil populations, and counselors. The flexibility available for information storage and retrieval inherent in electronic data processing would permit the implementation of extremely sensitive, imaginative, and individualized pupil information systems. What we now need most is evidence which will help define the specifications of such systems. Incidentally, I would like to suggest that this is an area in which researchers from universities and practitioners from schools and counseling centers could engage in extremely useful cooperative research.

Another problem area concerns the presentation of occupational and educational information. It has been apparent for some time that written presentations of educational and vocational information frequently fail to serve their purpose. Many individuals either won't read or don't understand the information. In part this is due to dull content and unimaginative writing style. In addition, a large number of counselees with which we are becoming increasingly concerned lack reading skills and are uncomfortable with written materials.

From another perspective occupational and educational information can be viewed as a method or vehicle which students use to speculate about or explore jobs and related training opportunities. There are, of course, other ways of speculating about and exploring the world of work and education. All of these could be ordered according to their levels of abstractions, and if such an ordering were to take place, one would probably place actual job tryout and school attendance on the least abstract end of the continuum (representing reality) and reading about schools and jobs, at the other extreme, representing the most abstract level of exploration. The other means of exploration which

fall between these two extremes, such as visiting schools and industry, listening to speakers, and viewing recruiting and orientation films, are relatively uncommon, and, in addition, cumbersome to use in guidance programs.

The vast majority of educational and vocational exploration, it is safe to assume, is at the written or reading level. It is questionable whether this is the most appropriate level for all individuals in light of the relative ability among the population to deal with things at advanced verbal levels of abstraction. It would appear that a great many individuals would derive greater understanding regarding education vocations if information were presented at lesser levels of abstraction.

There is, then, reason to experiment with other media for conveying occupational information. One such method which we have been exploring would be a system consisting of collections of multi-voiced audio tape-filmed educational occupational information packages, stored on a random access juke box-like machine. The basic format package would vary with the target population. For example, with underprivileged youth, the package format might involve a theme or story line similar to that employed in the western and adventure serials heard on radio. The objective would be to use a media with which the counselee is comfortable, and present educational and occupational information in such a way that it makes affective as well as cognitive sense to him. Photographs, particularly, should be an effective means of communicating certain aspects of educational and vocational environments and tasks.

Another area of research regarding information which I believe would be fruitful has to do with what might be designated as personal intelligence. Each of us would seem to have very private and very intimate information about ourselves, something beyond that obtained through objective measurement, which if organized and sorted appropriately, can be extremely useful in planning and deciding about vocations. For example, even prior to adolescence most of us have experienced working under pressure, following schedules and pursuing assigned tasks under supervisory conditions to which we develop very definite attitudes and reactions.

From such experiences each individual builds a store of highly personal intelligence about himself which can be useful for making decisions and plans for future activities. I would even suggest that most of us rely on such personal intelligence far more than we do on objective appraisal information and carefully prepared educational or vocational information. Therefore, I am simply suggesting that much of the stuff of decision making is affective and that affective information should be identified and made useful to the individual. Further, if my contention is correct, then personal intelligence needs to be provided for systematically in pupil appraisal programs.

There are, of course, many urgent questions concerned with the communication process per se in counseling, and we need research leading to improved communication skills for counselors.

CONCLUSION

In conclusion, I simply want to re-emphasize the idea that the age of cybernetics, including the information explosion, entails extremely challenging human development problems. Many of these, at first glance, may seem simply extensions of those with which counseling has always been concerned. But when we carefully examine what is emerging, I believe it will become apparent that the problems are of such a nature and magnitude that our existing repretoire of professional competencies and resources will fail us. With regard to the functions of information in counseling, I have suggested that we can make a significant beginning to meet these challenges by developing large scale guidance information support systems--systems which are both comprehensive in concern, and bold in concepts. We can increase the value of our social service even more by aggressively promoting research concerned with the many aspects of information in counseling. Leadership for both research and development must come from the profession, but I would hope that we capitalize on the tremendous technical assistance currently available to us from several sources. Just as individual counselors need support from others, so do the research and development efforts of the profession.